Image processing with Gimp, Part 2
UNDERSTANDING GIMP

SIMON BUDIG

If you ask about image processing under Linux, you will more than likely be referred to Gimp. Gimp (Gnu Image Manipulation Program) is a very flexible program. But first of all, you have to learn how to handle this flexibility. This is the second part of a series in which we will look at various aspects of Gimp. In this part, we'll be covering various tools and selections.

When you start Gimp for the first time, you will be met by a series of dialogs to help you create some important settings. At this stage the most important settings are on the fourth page. The size of the memory store is the maximum RAM consumption of Gimp. If you have plenty of RAM in your computer and are the main or sole user of the computer, you should consider allowing Gimp to use more than the preset 32MB RAM. About 75% of the available memory is a rule of thumb here. If Gimp should need more memory storage, it swaps image data to the hard disk. Especially if your home directory is integrated via NFS – thus over a network – you should change the settings for the swap directory and set, for example, */tmp* or */usr/tmp*. There is then no need to access the network to swap files, and the speed stays passable.

On the next page you can set details for screen resolution. This is only important when you set great store by, for example, wanting to process scanned images at exactly their original size. After that, the Gimp start dialog greets you. You have to wait a bit longer when you start it for the first time, since Gimp collects data on all the installed **plugins**. From the next time you start, this data will be read from a single file - this goes considerably faster.

The first thing you should do is position the window which now pops up sensibly on the screen (Figure 2). We prefer to place the window at the edge and leave the space in the middle for image windows. In any case, it's worthwhile reserving a separate workspace or 'virtual screen' for Gimp. But this does not work in the same way from one

window manager to another. Oh yes: *read* the Tips of the Day – they are very helpful, especially for newbies.

To repeat the first tip from Gimp: If you give a right-click in an image window a comprehensive menu will appear. Unlike the menu in the toolbox you can also save an image here. To distinguish between the two menus, the location will always be given first in angle brackets like so *<Toolbox>/File/Open* and *<Image>/File/Backup*.
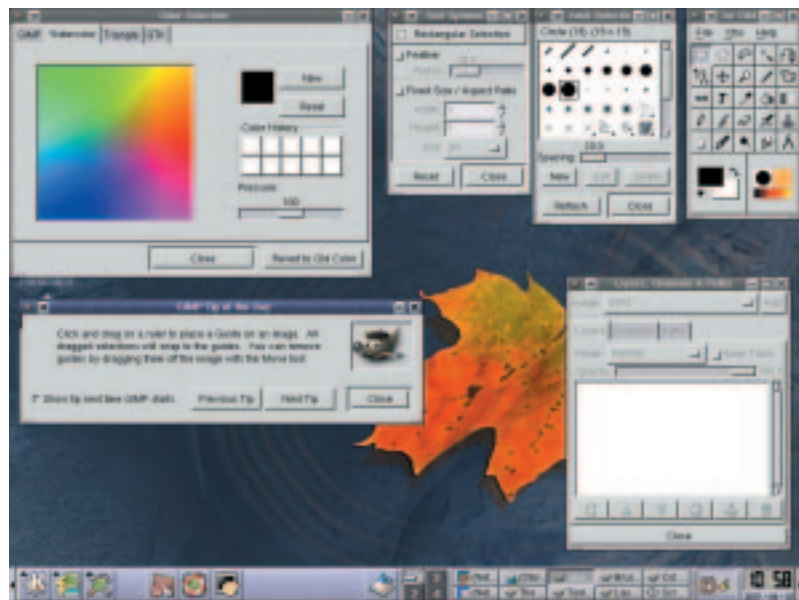
Toolbox

Let's take a look at the central station of Gimp: the *Toolbox*. In Figure 3 you can see the toolbox, in which the most important painting tools are marked in red. Here you can see the pencil, the paintbrush, the eraser, the airbrush and the ink tool. The two areas at the lower end of the toolbox indicate which colours and paintbrush are set, and offer rapid access to the corresponding selection dialogs.

Open a new image using *<Toolbox>/File/New*; you can happily accept the presets, but if necessary you can also create a somewhat larger image, For example, 500x500 **pixels**. With a click on the paintbrush symbol in the toolbox, you activate the paintbrush tool and can start painting in the image window. The paintbrush tool uses a really thick, round paintbrush to do this by default. Of course this is not suitable for all requirements, but Gimp offers a rich assortment of different paintbrushes (Figure 4). With a click on the small preview in the

Plugin: a little program, which is as it were 'plugged' into Gimp and adds image processing functions to Gimp.
Pixel: is an abbreviation for PICture Element and is the smallest unit of an image. Gimp processes pixel images almost exclusively - unlike programs such as Sketch, which construct images out of mathematically-defined elements.

lower right area of the toolbox, you can call up the paintbrush dialog. Here you can choose the paintbrush with which you want to work. When experimenting, you will also come across paintbrushes that behave somewhat differently to normal paintbrushes, as shown last month. With the slide adjuster *Distance* you can set here how far apart the individual paintbrush images are to be placed.

Softly softly

The pencil tool behaves at first glance in a similar way to the paintbrush tool, with the difference being that **paintbrushes** allow soft edges, while the pencil offers hard contours. This is especially important when you want to control images down to each individual pixel. Normally though, considerably better results are achieved with the paintbrush tool.

The airbrush is comparable to the paintbrush tool, but applies the colour much more slowly to the image. If you hold down the mouse button over one spot for a long time, more and more colour will be applied - just like a spray can in fact.

From our present point of view the eraser is nothing more than a paintbrush tool which always

paints with the background colour. I will not go into it any further at this point. That should be enough to start with.

The last of the painting tools is the ink tool, which simulates an ink pen. Unlike the other painting tools, it ignores the currently set paintbrush completely. On the other hand the thickness of the stroke depends on the speed. This tool takes on a new dimension when it is used together with a graphics tablet.

All the painting tools are considerably more flexible than they may appear right now. After a double-click on a tool symbol, the tool options open. Here it is possible to set more precisely how the tool should act, especially how heavily the colour is applied and should be combined with the existing image. Try out all the options, to get a feeling for the possibilities. But don't be surprised that the options for pressure sensitivity with a normal mouse are ineffective.

Colourful

Now let's turn to colour selection. In the toolbox at bottom left you will see two colour areas: The foreground and the background colours. One of these two areas appears to be 'pressed in', and this
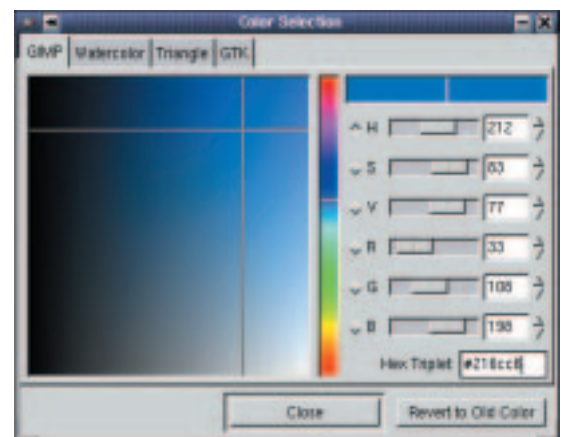
[left]
Figure 1: Starting Gimp

[right]
Figure 2: First distribute dialogs...

[left]
Figure 3: Gimp painting tools

[middle]
Figure 4: First paintings.

[right]
Figure 5: One of the colour selection dialogs

Figure 7: The selection tools

is the so-called *active colour*, which can be changed at various places. If you click on the active colour, a comprehensive colour selection dialog appears, which you can look at in Figure 5. You can switch between various types of dialog using the tabs. With a bit of background knowledge (see the Colour models box) you should soon be at home with the first dialog.

Selected

One area which is very important, especially for reprocessing photos is selections. One does not normally always want to cover the entire image with an effect or correct the colours. You have to somehow delimit the area to be processed - the more flexible tools there are, the better.

We have highlighted the basic tools in Figure 7 in red. From left to right: The rectangle and the ellipse selection tool, the free hand lasso, the magic wand and the 'intelligent' scissors. Other important tools can be found under*<Image>/Selection/...*.

Colour models

Figure 6: The HSV triangle

If an image is to be coloured, you are definitely going to have to get involved with colour modes. For Gimp, two colour models are decisive in this: RGB and HSV. We will also go into a third colour model (CMYK) at this point, which is unfortunately not yet supported by Gimp, but is very important in practice.

The RGB colour model is used by monitors to display colours. Physically, this is based on an additive colour system, which means colours are added to black (a switched off monitor is always black), until, at the maximum, white is produced. In accordance with the perception in the eye, the colours red, green and blue (RGB) are used here. This is sufficient to show the majority of colours. The drawback is that it can be difficult to guess the right depth of colour in order to obtain a certain hue.

The HSV colour model goes a different route, which makes it possible to create slightly different shadings and similar hues. A colour is defined here by stating the hue, saturation and value. Usually the hue is specified by means of a colour circle – you can see this circle in the outer area of the 'triangle' colour dialog. If you adjust the saturation downwards, the colour becomes more and more grey, with the value you can darken the colour. In the 'triangle' colour dialog you can see the relationship between the colours: the side opposite the coloured corner has a saturation of 0, the side opposite the black corner has the colour value of 100% (Figure 6).

The CMYK colour model plays a central role in the printing world. The physical basis for this is the subtractive colour model, which means for example, colours are gradually 'subtracted' from a 'white' sheet of paper, until one arrives at black, so it is as it were the opposite of the RGB colour model. In this case, colours are composed out of cyan, magenta and yellow. But since this only works brilliantly in theory, in practice black (key) is still used so as not to obtain merely a dirty brown as the darkest colour.

Neither the RGB nor the CMYK colour model are sufficient to reproduce all the colours which occur in nature on paper or monitor. In fact, in the CMYK model one is more likely to come up against barriers. Here, so-called decorative colours are used to expand the spectrum that can be shown further. But that's a science in itself...

Select the rectangle selection tool and use the mouse to drag a rectangle up in the image window. A broken line (the so-called *marching ants*) now marks the selected area, which you can drag back and forth using the mouse by clicking in the area and then moving the mouse with the mouse button pressed down. By clicking outside you can again anchor the area to the image. When an area is selected, the painting tools can only change this area. Try it out: Select an area and paint diagonal strokes over the image using the paintbrush tool. The strokes are only visible within the area. The ellipse tool works in a similar way.

If you want to select perfect circles or rectangles, you can press the Shift key while dragging the area up. It is important that you only press the key *after* first clicking with the mouse. With the Ctrl key you are defining that the first mouse click has defined the centre point of the ellipse/ rectangle.

Combining selections

Of course, not every shape you want to select is perfectly rectangular or elliptical. To adapt the selection as closely as possible to the desired shape, you can combine the various tools with each other. If, at the *start* of the mouse click the Shift key is pressed, the area will be added to the existing selection, with the Ctrl key the area will be subtracted. With both pressed at once the average will be formed. In Figure 8 a perfect circle is added to a selection. Gimp helps to remember the key combinations: A little plus sign shows that we are now adding to the selection.

Please note that these two actions are really independent of each other. The combination with the available selection is defined by the keys at the start of the click, the regularity of the selection is defined by the keys at the end of the click. So if you want to drag a perfect circle out of the selection, press the Ctrl key, then the left mouse button, release the Ctrl key, press the Shift key, drag the circle to the requisite size and then release the mouse button.

A Button

Is your head buzzing by now? Sorry, but these basics are too important just to cover superficially. Perhaps we should start a little project together now, so as to see how something like this could look in reality. The aim is to paint a button for a website. So that it invites the viewer to click on it, it should look slightly three-dimensional.

Open a new image, about 400x200 in size (*<Toolbox>/File/New*). Select, in the middle, a rectangular area (rectangle selection tool) and set as foreground colour a medium grey (colour dialog). Select the fill tool (the colour bucket) and click in the selected area: The rectangle is filled with grey.

A click on the black and white symbol at bottom left of the two colour fields in the toolbox resets the colours to black and white. Select the airbrush and a gently tapering paintbrush. With an opacity power of about 50% (in the tool options which pop up when you double-click on the airbrush), move along the lower and right edge of the selection. The selection prevents you from painting into the white area. After that, click on the double arrow at top right of the two colour fields to swap the foreground and background colours. With the white colour, repeat this on the upper and left side of the rectangle.

Text

You have now created the slightly three-dimensional-looking basis for a button. All we really need now is a colourful caption. For this we can use the text tool. Click on the 'T' in the toolbox and then on the grey rectangle. In the dialog that appears, you can enter text and select a font type/size. Since we tend to have one-track minds, we have entered 'Gimp' here. Century Schoolbook I has been selected as the font, which comes with the *freefont* packet in many distributions. In my case, the size is 64 point. If you now click on OK, the text appears in the image, although rarely at the spot where you want it. Move the mouse cursor to the text (it turns into a little cross) and drag it to the right place.

You will have noticed that the text is also selected. We can now take advantage of this. Pick a nice bright colour and the paintbrush tool. Then simply drag a couple of strokes diagonally over the text (Figure 9). Due to the selection, you are only painting on the text itself and can thus provide it with a decoration. Incidentally, you can cancel the last steps with Ctrl+Z if you have made a mistake somewhere.

The text is still a so-called *floating selection*, which means that it can be moved around with a selection tool, without the image information underneath it (our grey button) being destroyed. In order to anchor this floating selection to the image again, you can either press Ctrl+H or set the rectangle selection tool and click outside the text in the image. The selection borders disappear, and the text is fixed to the image.

Pattern

Now the button just has to be tailored to its final size and saved. To do this, select the *cropping* tool, which is represented in the toolbox by a scalpel and is found next to the magnifying glass. In a similar way to selecting a rectangle, draw a frame around the button. It's all right if it's a bit too big, as you can change the area by clicking on the four corner handles or entering the co-ordinates numerically in the dialog box. In our case an automatic shrink is

enough to adapt the box precisely to our button. The image size is changed with a click on 'cutting'.

Lastly, we save the image: With *<Image>/File/Save as...* the save dialog appears. Here you can simply enter a file name. Depending on what ending it has, Gimp searches for the corresponding format. I would suggest at this point that you use the JPEG format with the ending *.jpg*, the quality 0.90 and smoothing 0.05. In the image window, you can assess in advance how the image will look afterwards (the JPEG format creates visible defects in some circumstances). The other options are of a more technical nature and can be left in the default settings. Voila – our button is finished.

Outlook

We won't hide from you the fact that this is a very tedious way of creating such buttons, but you should have an idea by now of how to make simple things with Gimp. In the next installment we will look at additional features in connection with selections and prepare scanned images. ∎

The author

Simon Budig has known Gimp since Version 0.99.10 and has recently tried out Version 0.54 just for fun. What a laugh. When he is not writing Gimp articles or giving lectures on Gimp, he is trying to complete his degree in mathematics at the University of Siegen.

[below]
Figure 8: Here a perfect circle is being added to a selection

[bottom]
Figure 9: Two steps in one: Create text and colour it...